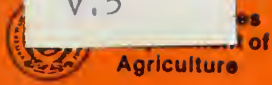


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Soil
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FLOOD PLAIN MANAGEMENT

**A Study Of South Fork
Shenandoah Tributaries**

Rockingham County, Virginia

APPENDIX V

DRY RUN

August 1983

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FOREWORD

The main report on the Flood Plain Management Study of South Fork Shenandoah River Tributaries provides information and data needed for use by administrators and the general public. Discussion of findings and recommendations relevant to the total study area are included.

Eight appendixes or technical reports include specifics on each tributary as listed below. Tables, flood profiles and area-flooded photomaps provide information for user agencies and individuals to make technical decisions and to comply with regulations related to the use of flood plains.

Appendix I	Stony Run
Appendix II	Quail Run - Boone Run
Appendix III	Cub Run - Big Run
Appendix IV	Naked Creek
Appendix V	Dry Run
Appendix VI	Hawksbill Creek
Appendix VII	Mill Creek - Congers Creek
Appendix VIII	Pleasant Run

Appreciation is extended to those who contributed their active interest, cooperation, and information to this project.

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Dry Run

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APPENDIX V
South Fork Shenandoah River Tributaries
FLOOD PLAIN MANAGEMENT STUDY
Technical Report
DRY RUN
Rockingham County, Virginia

INTRODUCTION

This technical report on Dry Run is one of eight such appendixes to the Flood Plain Management Study on South Fork Shenandoah River Tributaries. The main report includes items such as authorities, responsibilities, scope, procedures, description, recommendations, and data common to the tributaries and relevant to the total project.

The first sections of this appendix present general information pertinent to the study on Dry Run. Included are brief discussions of natural values, alternate solutions to the flood problems, and suggested items for the flood plain management program. The last section contains data and exhibits needed to make technical decisions for regulation and use of the flood plain.

DESCRIPTION OF STUDY AREA

Upstream Drainage Area

The Dry Run drainage area is 7.7 square miles. This stream empties into the South Fork Shenandoah River from the east. The Shenandoah River is a subbasin of the Potomac River which is in the Mid-Atlantic Region as designated by the Water Resources Council. The USGS Hydrologic Unit code number in the area is 02070005. The watershed is in the Appalachian Ridges and Valleys physiographic province. Soils in the lower part of Dry Run drainage area are formed on river terraces of alluvial or colluvial material. Monongahela-Unison-Cotaco is the predominant soil association. Soils in the upper part of the drainage area are formed in residuum of sandstone, shale or greenstone. Drall-Laidig is the predominant soil association in this area. Land use for Dry Run is about 55 percent woods, 17 percent pasture, 26 percent cropland; with the remaining 2 percent farmsteads, roads, and rural built-up areas.

Flood Plain

The study area includes the flood plain along 5.5 miles of Dry Run, which extends from the junction at South Fork Shenandoah River to the Shenandoah National Park. Land use in the Dry Run flood plain is about 30 percent woods, 40 percent pasture, hay or idle land, 9 percent crop and 21 percent miscellaneous. About 7 bridges, 9 farm structures, and 15 dwellings on Dry Run are subject to varying amounts of damage during extreme floods.

Natural and Beneficial Flood Plain Values

Dry Run supports native or "put and take" trout populations, primarily in its headwaters. Dry Run is mostly in wooded cover which provides good habitat for fish and wildlife populations. Practices that maintain this forest cover would be the best way to preserve this high natural value. This stream does not contain any known nationally threatened or endangered species, or significant wetlands. Two important fish species that occur in the Potomac River drainage, of which Dry Run is a part, are possible inhabitants of this stream. These are the Pearl Dace, Semotilus margarita, and the Slimy Sculpin, Cottus cognatus. These fish were recognized by the Endangered Species Symposium at Virginia Polytechnic Institute and State University at Blacksburg in May 1979 as being of "special concern" to the State of Virginia.

FLOOD HISTORY

Dry Run is adjacent to Naked Creek, but is not as heavily populated. The land use is mostly pasture and forest with scattered dwellings and farm structures. Average annual damages are estimated to be \$30,000.

FLOOD POTENTIAL

Present Conditions

Extreme floods would inundate about 220 acres in Dry Run (see table below). Velocities would average about three feet per second in the flood plain and exceed five feet per second in some reaches. Out-of-bank stages would range from about one to six feet. Duration of flooding would seldom exceed six hours except during storms of intense and prolonged rainfall.

<u>Type of Damage</u>	<u>Acres Inundated</u>	
	<u>100-year flood</u>	<u>500-year flood</u>
	<u>Dry Run</u>	<u>Dry Run</u>
Pasture and Woods	154	168
Cropland	20	22
Miscellaneous	46	50
	<u>220</u>	<u>240</u>

Limitations on Use of Data. The flood elevations given in this report should be considered as minimum elevations. During floods, uprooted trees and other debris may collect on bridges and culverts and clog the channels. Such obstructions increase the depth and extent of flooding. Analyses were made without showing the effects of potential obstructions. Also, extremely rare events such as dam failure and climatic changes were not analyzed.



Fig. 2 Looking downstream (NW) as Route 625 crosses Dry Run at Section DR-12.



Fig. 3 Looking downstream (W) as Route 625 crosses Dry Run at Section DR-16.

Future Conditions

The hydrologic conditions in the upstream areas are expected to improve as farmers and foresters continue to apply good management and conservation practices. This improvement is expected to reduce runoff approximately to the extent that additional development will increase runoff. Therefore, the flood hazard and damage potential is not expected to change significantly in the next 5 to 10 years.

FLOOD PLAIN MANAGEMENT

The main report includes a discussion of existing programs, current regulations, availability of flood insurance, recommendations, and related items relevant to the total study. The items discussed below relate only to Dry Run.

Floodway. The data for a "first trial" or computed floodway is filed with the basic data for Dry Run. The results indicate that hazardous conditions of depth and/or velocity prevail at current 100-year flood levels in most reaches, and that generally no additional encroachment should be allowed. The data can be used as a basis for further study of local measures, but it is suggested that no continuous or extensive floodway be considered.

Recommendations

In preparation of their comprehensive flood management program, the local sponsors should implement the following recommendations on Dry Run:

- Monitor future developments in the watershed to assure that regulations are followed so as not to increase the flood hazard;
- Assist landowners in studies of local protection measures to reduce streambank erosion and the spread of floodwaters; and
- Encourage the re-establishment of natural vegetation in the flood plain to restore the fish and wildlife habitat.

Evaluation of Potential

The potential for reducing the flood hazard on Dry Run is limited by the relatively low value of damages from flooding. Yet, the damages are great enough to warrant serious consideration. Due to the relatively low damage value, flood control dams could not be economically justified.

Hydrologic conditions under current land use and management practices are generally good to excellent. An improved conservation use-and-land treatment only program would provide only limited reductions in runoff and flood stages.

The primary opportunities have to do with relocation of existing structures, possible flood proofing, prohibition of future construction or other encroachment in the flood plains, and enactment of other regulations needed to avoid increased runoff and to minimize flood damages.

TECHNICAL DATA AND EXHIBITS

This section provides the data and exhibits needed by user agencies and individuals to make technical decisions and to comply with regulations on use of the flood plain on Dry Run.

The index map shows the area covered by the individual photomaps. Flood hazard photomaps show the area inundated by the 100 and 500-year floods. Where only one line is shown, there is no significant difference in the boundaries of the two flood areas. These photomaps should only be used to determine approximate flood elevations; they are based on semicontrolled mosaics and the boundaries shown may vary from the location on the ground.

Flood profile plates provide elevations of the 10, 50, 100 and 500-year floods at any location along the length of the streams. The elevations and discharges of the 10, 25, 50, 100 and 500-year flood at each surveyed cross section are given in Table DR-1. Sample cross sections illustrated how the flood area boundaries were located. Table DR-2 provides the description and elevation of benchmarks which are located on the photomaps.

Table DR-1 can be used to locate flood elevations on the ground at surveyed cross sections.

The photomaps, flood profiles and bench mark data can be used to locate flood elevations between surveyed cross sections, as follows:

1. On the appropriate photomap find the point on the stream where the flood line is to be located; then scale the distance along the stream to the nearest cross section.
2. On the appropriate flood profile sheet, scale the distance determined in Step 1 from the cross section back to the original stream location, and read the elevation of the desired flood frequency line.
3. Transfer the elevation determined in Step 2 to the ground from the nearest established benchmark.

A glossary, bibliography and discussion of technical procedures are included in the main report for this study. The basic data is on file in the office of the USDA Soil Conservation Service, Richmond, Virginia 23240.

78° 45' 00"

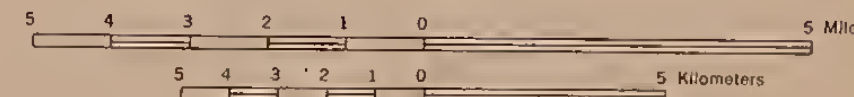
78° 30' 00" 38° 30' 00"





VIRGINIA



INDEX TO PHOTOMAP SHEET COVERAGE SOUTH FORK SHENANDOAH RIVER TRIBUTARIES PAGE COUNTY AND ROCKINGHAM COUNTY, VIRGINIA



LEGEND

-  Stream channel
-  Sheet coverage

AUGUSTA CO

79° 00' 00"

38° 15' 00"

78° 45' 00"

Source: SCS county base checked to USGS quads



LEGEND

→ Stream channel

500 year flood area

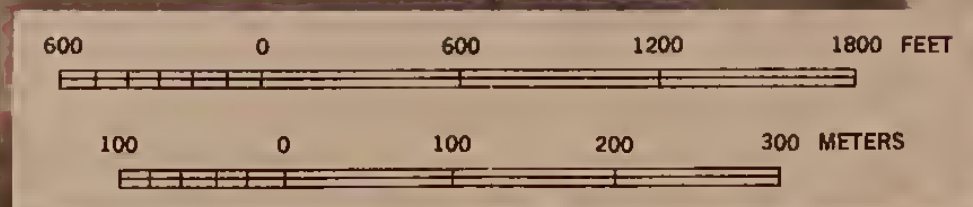
100 year flood area

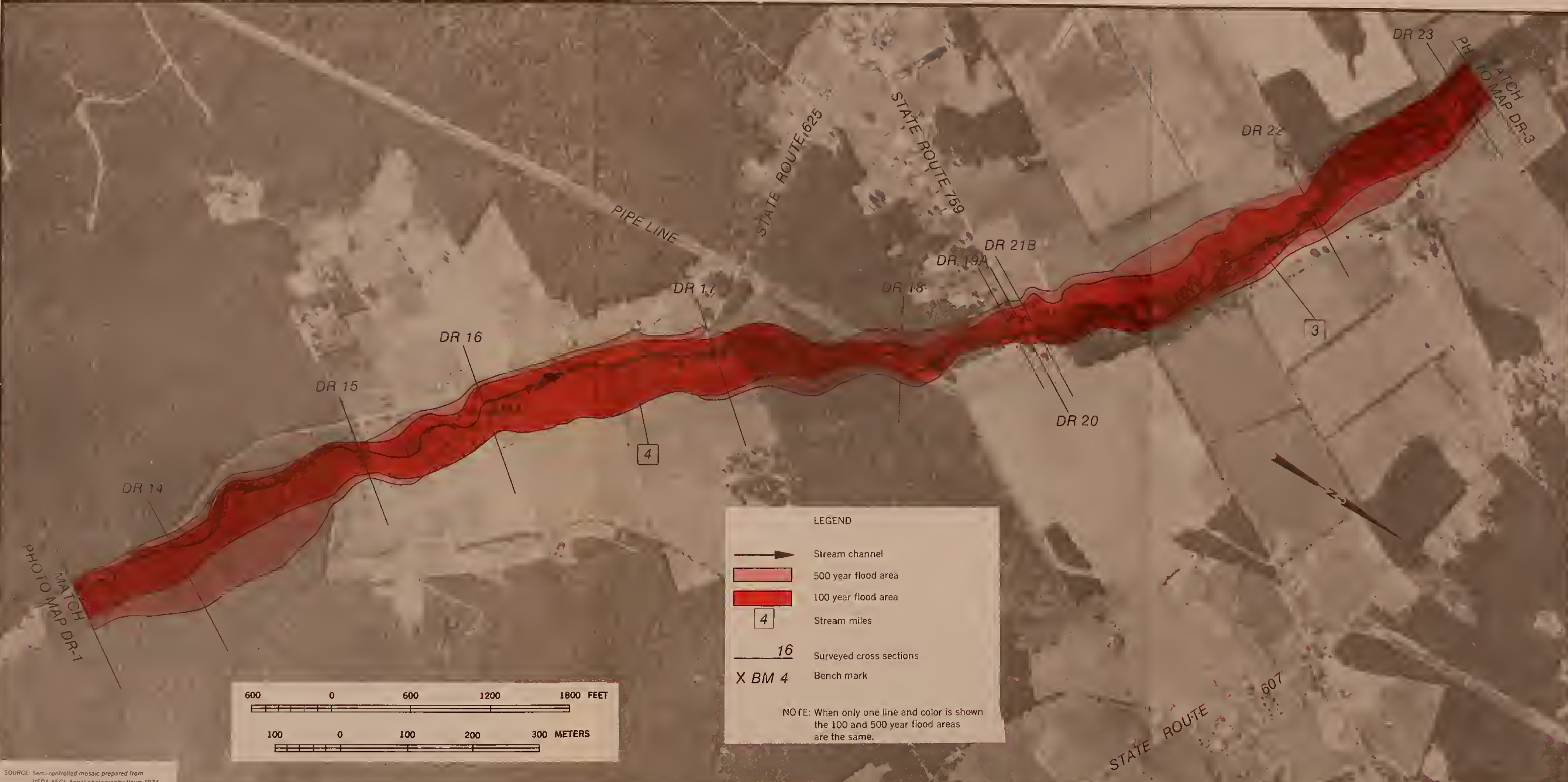
5 Stream miles

12 Surveyed cross sections

X BM 8 Bench mark

NOTE: When only one line and color is shown the 100 and 500 year flood areas are the same.





SOURCE: Semi-controlled mosaic prepared from
USDA-ASCS Aerial photography flown 1974

USDA-SCS-FORT WORTH, TEXAS 1983

PHOTO MAP DR 2

DRY RUN

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOUTH FORK SHENANDOAH RIVER TRIBUTARIES
FLOOD PLAIN MANAGEMENT STUDY
ROCKINGHAM COUNTY, VIRGINIA

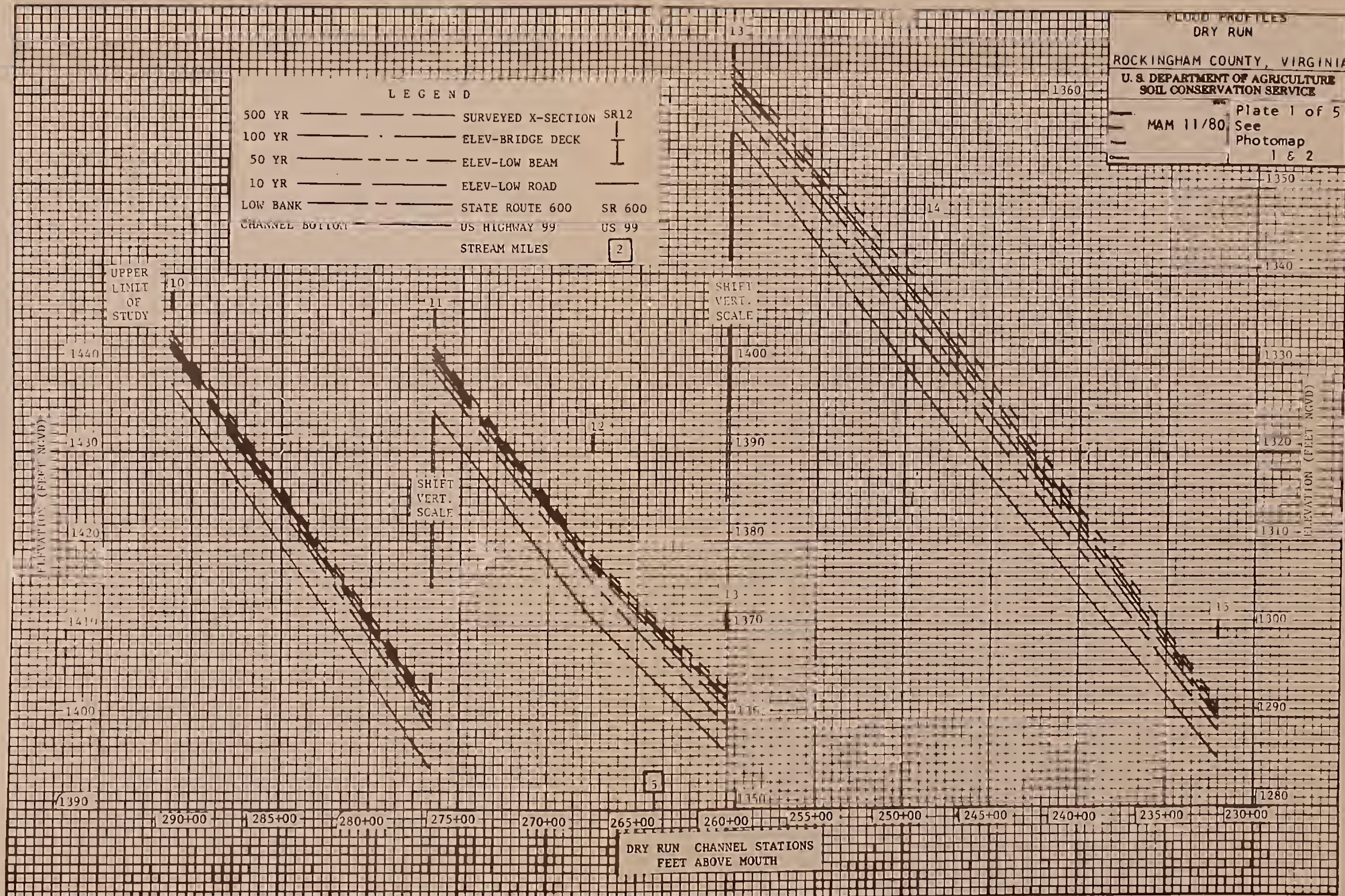
SHEET 2 OF 3



ROCKINGHAM COUNTY, VIRGINIA
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

MAM 11/80 Plate 1 of 5
See
Photomap
1 & 2

500 YR	_____	SURVEYED X-SECTION	SR12
100 YR	_____	ELEV-BRIDGE DECK	I
50 YR	_____	ELEV-LOW BEAM	I
10 YR	_____	ELEV-LOW ROAD	_____
LOW BANK	_____	STATE ROUTE 600	SR 600
CHANNEL BOTTOM	_____	US HIGHWAY 99	US 99
		STREAM MILES	2



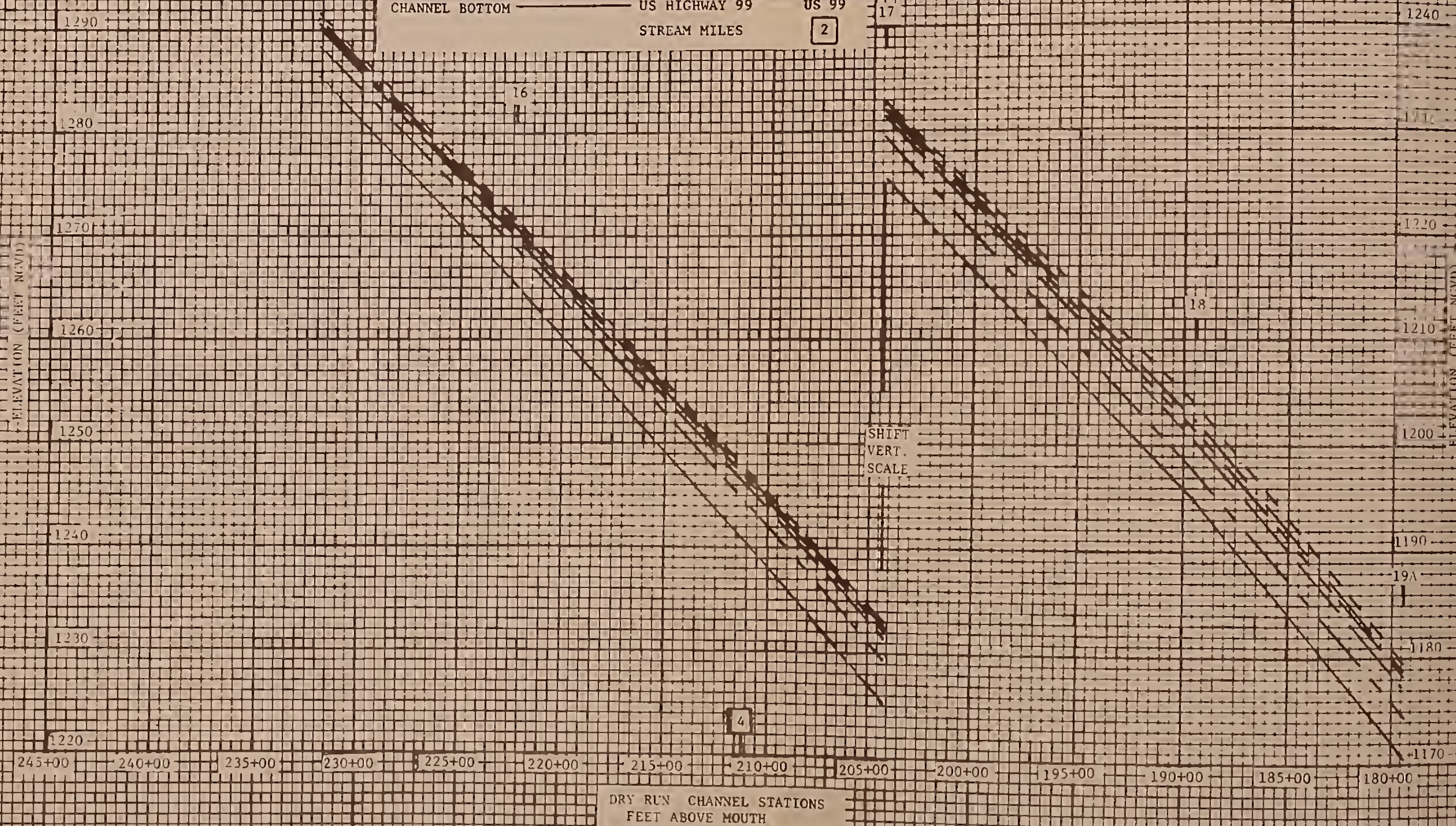
FLOOD PROFILES DRY RUN

ROCKINGHAM COUNTY VIRGINIA
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

MAM 11/80 Plate 2 of 5
See Photomap 2

LEGEND

500 YR	-----	SURVEYED X-SECTION	SR 17
100 YR	-----	ELEV-BRIDGE DECK	I
50 YR	-----	ELEV-LOW BEAM	I
10 YR	-----	ELEV-LOW ROAD	---
LOW BANK	-----	STATE ROUTE 600	SR 600
CHANNEL BOTTOM	-----	US HIGHWAY 99	US 99
		STREAM MILES	2



DRY RUN CHANNEL STATIONS
FEET ABOVE MOUTH

LEGEND

500 YR	—————	SURVEYED X-SECTION	SR25
100 YR	- - - - -	ELEV-BRIDGE DECK	I
50 YR	-----	ELEV-LOW BEAM	I
10 YR	—————	ELEV-LOW ROAD	—————
LOW BANK	- - - - -	STATE ROUTE 600	SR 600
CHANNEL BOTTOM	—————	US HIGHWAY 99	US 99
		STREAM MILES	2

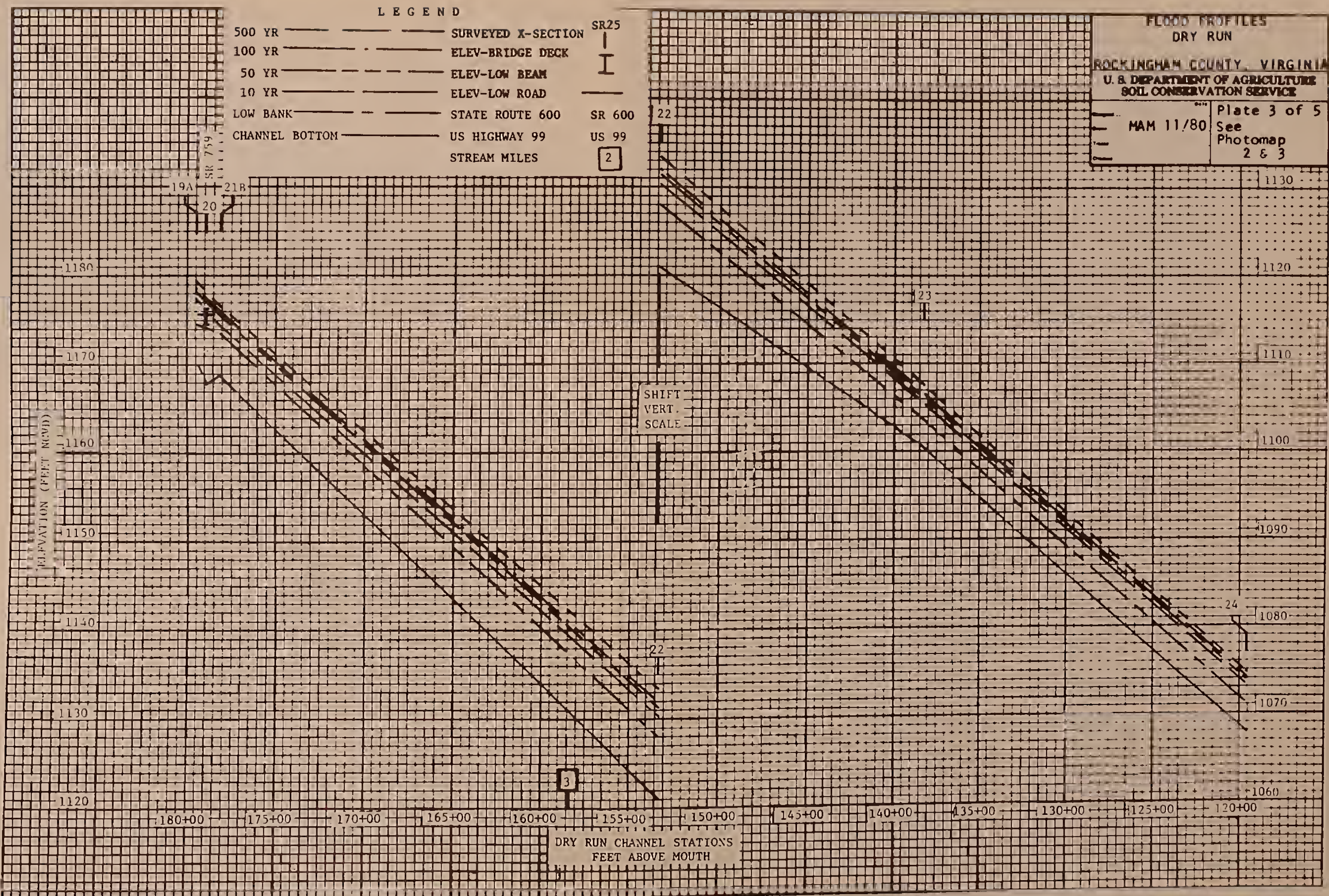
FLOOD PROFILES
DRY RUN

ROCKINGHAM COUNTY, VIRGINIA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

MAM 11/80

Plate 3 of 5
See
Photomap
2 & 3



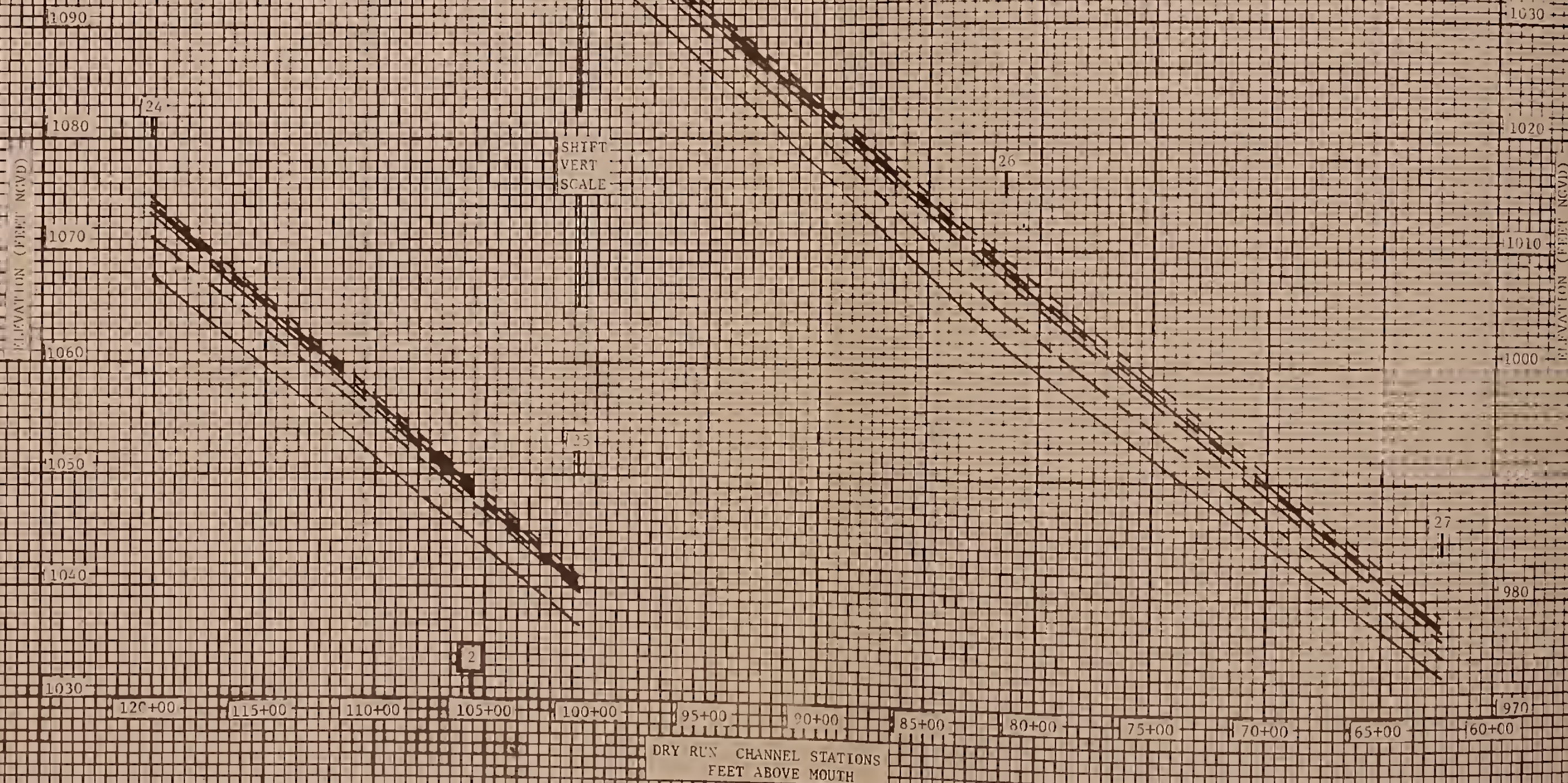
FLOOD PROFILES DRY RUN

ROCKINGHAM COUNTY, VIRGINIA
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date: Plate 4 of 5
MAM 11/80 See
Photomap 3

LEGEND

500 YR	—	SURVEYED X-SECTION	SR25
100 YR	- - -	ELEV-BRIDGE DECK	I
50 YR	- - -	ELEV-LOW BEAM	I
10 YR	- - -	ELEV-LOW ROAD	I
LOW BANK	- - -	STATE ROUTE 600	SR 600
CHANNEL BOTTOM	—	US HIGHWAY 99	US 99
		STREAM MILES	2



FLOOD PROFILES
 DRY RUN
 ROCKINGHAM COUNTY, VIRGINIA
 U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

MAM 11/80 Plate 5 of 5
 See Photomap 3

LEGEND			
500 YR	—	SURVEYED X-SECTION	SR12
100 YR	- - -	ELEV-BRIDGE DECK	
50 YR	- - -	ELEV-LOW BEAM	
10 YR	- - -	ELEV-LOW ROAD	
LOW BANK	- - -	STATE ROUTE 600	SR 600
CHANNEL BOTTOM	- - -	US HIGHWAY 99	US 99
		STREAM MILES	2

ELEVATION (FEET NCVD)

980

970

960

950

940

930

920

910

980

970

960

950

940

930

920

910

JCT
 SOUTH
 FORK
 SHEN.
 RIVER

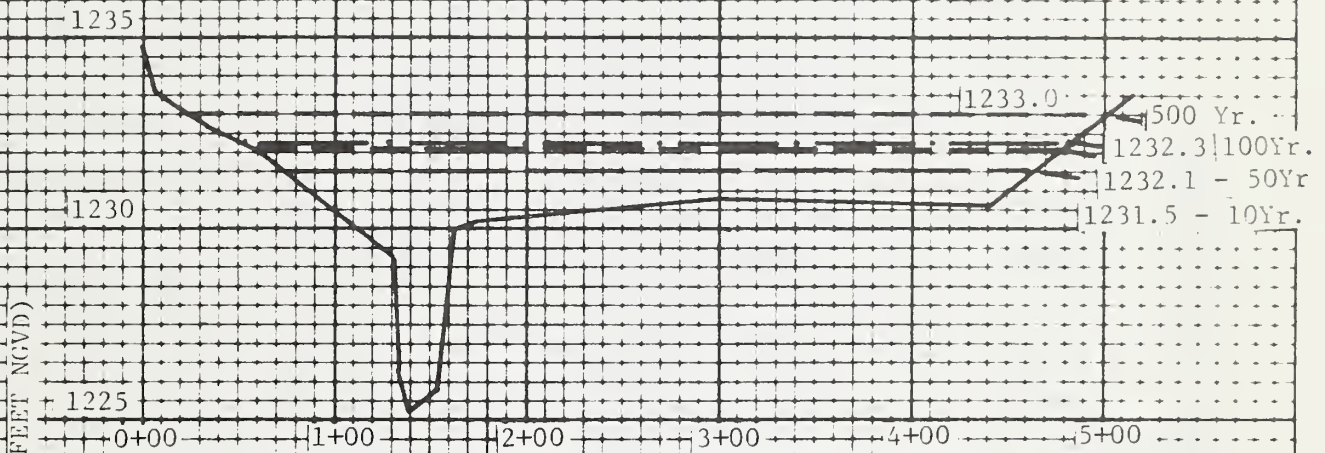
SR
 340
 28A 29 30B

60+00 55+00 50+00 45+00 40+00 35+00 30+00 25+00 20+00 15+00 10+00 5+00 100+0

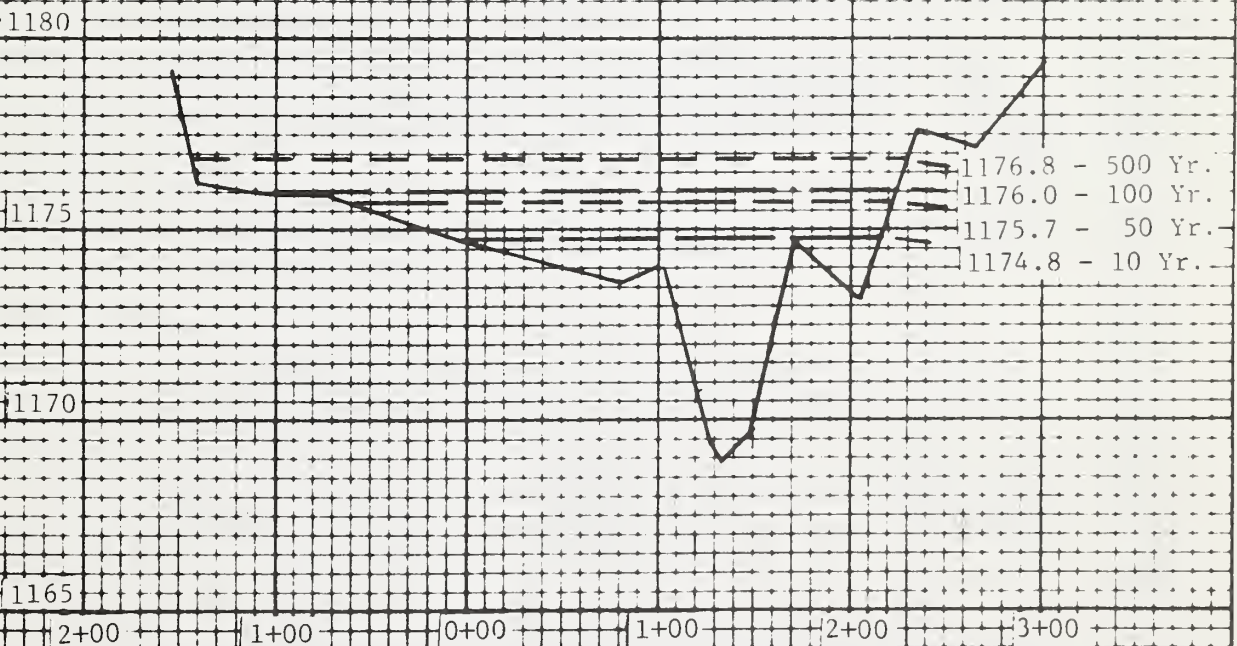
DRY RUN CHANNEL STATIONS
 FEET ABOVE MOUTH

**TYPICAL CROSS SECTIONS
DRY RUN**
ROCKINGHAM COUNTY, VIRGINIA
**U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE**

Designed ... Drawn ... Traced ... Checked ...	Date ...
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CROSS SECTION 17



CROSS SECTION 21B

Table DR-1 Frequency-discharge-elevations, Dry Run
South Fork Shenandoah River Tributaries, Rockingham County, Virginia

Photo Map No.	Profile Plate No.	DA (sq. mi.)	10-year		25-year		50-year		100-year		500-year		
			Disch. (cfs)	Elev. (ngvd)	Disch. (cfs)	Elev. (ngvd)	Disch. (cfs)	Elev. (ngvd)	Disch. (cfs)	Elev. (ngvd)	Disch. (cfs)	Elev. (ngvd)	
Dry Run - Upper Limit of Study													
DR10	DR1	1	1.53	980	1441.9	1260	1442.4	1600	1442.7	1810	1442.9	2580	1443.6
DR11	DR1	1	2.45	1380	1400.3	1840	1400.8	2300	1401.1	2620	1401.3	3720	1402.0
DR12	DR1	1	2.55	1390	1377.2	1850	1377.5	2310	1377.8	2630	1378.0	3730	1378.7
DR13	DR1	1	2.73	1490	1361.4	1990	1361.8	2490	1362.3	2810	1362.6	4010	1363.6
DR14	DR2	1	2.86	1540	1333.3	2060	1334.3	2580	1335.1	2940	1335.7	4200	1337.8
DR15	DR2	1&2	3.21	1670	1290.1	2240	1290.5	2800	1290.8	3220	1291.1	4550	1291.9
DR16	DR2	2	3.28	1680	1269.9	2250	1270.3	2810	1270.7	3230	1271.0	4560	1271.8
DR17	DR2	2	3.60	1810	1231.5	2440	1231.7	3060	1232.1	3500	1232.3	4980	1233.0
DR18	DR2	2	3.87	1910	1200.4	2560	1201.0	3200	1201.7	3700	1202.3	5290	1204.0
DR19A	DR2	2&3	4.10	1990	1177.5	2700	1178.0	3390	1178.4	3910	1178.7	5500	1179.5
DR20R	DR2	3	4.10	State Route 759, Low road 1175.60, Low steel 1174.80, Bridge deck 1176.1									
DR21B	DR2	3	4.11	2000	1174.8	2710	1175.4	3400	1175.7	3920	1176.0	5510	1176.8
DR22	DR2	3	4.38	2090	1130.2	2850	1130.7	3550	1131.4	4120	1132.0	5850	1133.5
DR23	DR2	3	4.68	2190	1105.3	3000	1105.7	3740	1106.0	4330	1106.5	6080	1107.4
DR24	DR3	3&4	4.89	2260	1073.4	3100	1073.7	3860	1074.0	4490	1074.1	6390	1074.8
DR25	DR3	4	5.13	2350	1039.7	3210	1040.0	4000	1040.3	4690	1040.4	6570	1041.0
DR26	DR3	4	5.42	2450	1007.3	3370	1007.7	4210	1008.2	4900	1008.5	6860	1009.4
DR27	DR3	4&5	6.00	2640	976.7	3600	977.1	4490	977.5	5200	977.6	7200	978.4
DR28A	DR3	5	6.24	2700	951.5	3700	952.8	4600	953.4	5320	953.8	7360	955.0
DR29R	DR3	5	6.24	State Route 340, Low road 952.4, Low steel 952.6, Bridge deck 954.6									
DR30B	DR3	5	7.73	3160	948.5	4230	948.9	5230	949.1	6040	949.4	8370	950.0
Jct South Fk Shen		5	7.73		933.8				939.5		941.7		948.6

Table DR-2 Descriptions of Elevations Reference Marks, Dry Run
Rockingham County, Virginia - 1980

Photo B.M. Sheet		<u>Description, location and elevation</u>
<u>No.</u>	<u>No.</u>	
8	1	SCS TBM - A square chiseled on the downstream northeast corner of low water bridge, State Route 625, approximately 150 feet southeast of olive color trailer. Elevation 1374.18
4	2	SCS TBM - SCS disk in base of telephone pole #16 approximately 30 feet southeast of low water bridge and approximately 100 feet southeast of V. P. Eppard mail box. Elevation 1268.04
1	2	SCS TBM - On the top end of buggy axle embedded in the concrete on the downstream southwest corner of bridge abutment, State Route 759. Elevation 1176.89
17	3	SCS TBM - A square chiseled on the northeast abutment of bridge on State Route 340 Elevation 953.96

Note: Elevation in feet above National Geodetic Vertical Datum of 1929.



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